DIRECT TESTIMONY

of

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FINANCE DEPARTMENT

FINANCIAL ANALYSIS DIVISION

ILLINOIS COMMERCE COMMISSION

Charmar Water Company

Docket No. 03-0400

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TABLE OF CONTENTS

1   **WITNESS IDENTIFICATION**

2   **Q.   Please state your name and business address.**

3   A.   My name is Michael McNally. My business address is 527 East Capitol Avenue,

4   Springfield, IL 62701.

5   **Q.   What is your current position with the Illinois Commerce Commission**

6   **("Commission")?**

7   A.   I am presently a Senior Financial Analyst in the Finance Department of the Financial

8   Analysis Division.

9   **Q.   Please describe your qualifications and background.**

10 A.   In May of 1993, I received a Bachelor of Arts degree in Economics from the

11   University of Illinois at Urbana-Champaign. In May of 1999, I received a Master of

12   Business Administration degree, with a concentration in Finance, from the

13   University of Illinois at Urbana-Champaign. I have been employed by the

14   Commission since June 1999. I was promoted to Senior Financial Analyst in April

15   of 2002.

16 **Q.   Please state the purpose of your testimony in this proceeding.**

17 A.   The purpose of my testimony is to present my analysis of the cost of capital of, and

18   recommend an overall rate of return for Charmar Water Company (the "Company").

19   **COST OF CAPITAL**

20   **Q.**   **Please summarize your cost of capital findings.**

21   A.   The overall cost of capital for the Company equals 8.49%, as shown on Schedule

22   4.1.

23   **Q.**   **Please define the overall cost of capital for a public utility.**

24   A.   The overall cost of capital equals the sum of the component costs of the capital

25   structure (i.e., debt, preferred stock, and common equity) after each is weighted by

26   its proportion to total capital. It represents the rate of return the utility needs to earn

27   on its assets to satisfy contractual obligations to, or the market requirements of, its

28   investors.

29   **Q.**   **Why must one determine an overall cost of capital for a public utility?**

30   A.   A primary goal of regulation is to properly balance the interests of a utility's

31   ratepayers and investors. This is accomplished by minimizing the cost of reliable

32   service to ratepayers while allowing utilities to earn a fair and reasonable rate of

33   return on rate base.

34   Regulators should authorize a rate of return for public utilities that equals the

35   investor-required rate of return for companies with similar risk characteristics.

36   When public utilities charge rates that reflect an authorized rate of return that

37   exceeds the cost of capital, customers are encumbered with excessive prices.

38   Conversely, when public utilities charge rates that reflect an authorized rate of return

39   below the cost of capital, the financial integrity of the utility suffers, making it difficult

40   for the utility to attract capital at a reasonable cost. Ultimately, the utility's inability to

41   raise sufficient capital would impair service quality. Customers are best served

42   when the authorized rate of return on rate base equals the overall cost of capital.

43   In authorizing a rate of return on rate base equal to the overall cost of capital, all

44   costs of service are assumed reasonable and accurately measured. If

45   unreasonable costs continue to be incurred, or if any reasonable cost of service

46   component is measured inaccurately, then the authorized rate of return on rate base

47   will not balance ratepayer and investor interests.

48   **Capital Structure**

49   **Q.   What capital structure did the Company propose for setting rates?**

50   A.   The Company proposes using Utilities, Inc.'s ("UI") December 31, 2002 capital

51   structure, comprising 59.76% long-term debt and 40.24% common equity.[1] The

52   Company's proposed capital structure appears on Schedule 4.1.

53   **Q.   What capital structure do you recommend?**

54   A.   The Company is a 100% equity financed, wholly owned subsidiary of UI.[2] Thus, the

55   financial risk of the Company is essentially the financial risk of UI, and adopting UI's

56   capital structure is appropriate. I recommend adopting a December 31, 2002,

57   capital structure comprising 59.79% long-term debt and 40.21% common equity, as

58   shown on Schedule 4.1.

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[1] Company response to Staff data request MGM 2.01.
[2] Company response to Staff data request MGM 2.02.

59 Q. **Did you include short-term debt in the Company's capital structure?**

60 A. No. The Company only carried a monthly ending balance of total short-term debt

61 during two months from June 2002 through June 2003.[3] Thus, short-term debt did

62 not play a continual role in the financing of the Company's rate base during the

63 months surrounding the Company's chosen capital structure measurement date and

64 should not be included in its capital structure.

65 Q. **Please describe the adjustments you made to the Company's proposed**

66 **long-term debt balance.**

67 A. I made two adjustments to the Company's long-term debt balance. First, I included

68 current maturities in the calculation of the face amount outstanding. Second, I used

69 the "carrying value" of UI's outstanding long-term debt, as shown on Schedule 4.2,

70 for the long-term debt balance presented on Schedule 4.1. Carrying value equals

71 the face amount outstanding less the unamortized debt expense.[4] The carrying

72 value of total long-term debt should be used because it reflects the total net

73 proceeds available for investment. The Company incorrectly used the face amount

74 outstanding as of December 31, 2002 less current maturities.[5]

75 Q. **Does capital structure affect the overall cost of capital?**

76 A. Yes. Capital structure affects the value of a firm and, therefore, its cost of capital, to

77 the extent it affects the expected level of cash flows that accrue to third parties (i.e.,

78 other than debt and stock holders). Employing debt as a source of capital reduces

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[3] Company response to Staff data request MGM 1.07.

[4] Debt expense represents the costs a utility incurred to issue debt. The unamortized balance of debt expense represents the portion of that cost a utility has not yet had an opportunity to recover.

[5] Company response to Staff data request MGM 1.02 and Company work paper W/P [h-1].

79 a company's income taxes,[6] thereby reducing the cost of capital; however, as

80 reliance on debt as a source of capital increases, so does the probability of

81 bankruptcy. As bankruptcy becomes more probable, expected payments to

82 attorneys, trustees, accountants and other third parties increase. Simultaneously,

83 the expected value of the income tax shield provided by debt financing declines.

84 Beyond a certain point, a growing dependence on debt as a source of funds

85 increases the overall cost of capital. Therefore, the Commission should not

86 determine the overall rate of return from a utility's actual capital structure if the

87 Commission concludes that capital structure adversely affects the overall cost of

88 capital.

89 An optimal capital structure would minimize the cost of capital and maintain a

90 utility's financial integrity. Unfortunately, determining whether a capital structure is

91 optimal remains problematic because (1) the cost of capital is a continuous function

92 of the capital structure, rendering its precise measurement along each segment of

93 the range of possible capital structures problematic; (2) the optimal capital structure

94 is a function of operating risk, which is dynamic; and (3) the relative costs of the

95 different types of capital vary with dynamic market conditions. Consequently, one

96 should determine whether the capital structure is consistent with the financial

97 strength necessary to access the capital markets under most if not all economic

98 conditions, and if so, whether the cost of that financial strength is reasonable.

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[6] The tax advantage debt has over equity at the corporate level is partially offset at the individual investor level. Debt investors receive returns largely in the form of current income (i.e., interest). In contrast, equity investors receive returns in the form of both current income (i.e., dividends) and capital appreciation (i.e., capital gains). Taxes on dividends and capital gains are lower than taxes on interest income because dividends and capital gains tax rates are lower and taxes on capital gains are deferred until realized.

99   Towards that end, I compared the Company's December 31, 2002 capital structure[7]

100   to utility industry benchmarks. Standard & Poor's ("S&P") categorizes debt

101   securities on the basis of the risk that a company will default on its interest or

102   principal payment obligations. The resulting credit rating reflects both the operating

103   and financial risks of a utility.[8] Although no formula exists for determining a credit

104   rating, S&P publishes utility target values, by business profile score, for four

105   financial ratios it includes in its credit ratings analyses, including the total debt ratio.

106   According to S&P, BBB-rated utilities with a business profile score of 3 should have

107   a total debt to total capital ratio between 53.0% and 61.0%.[9] The Company's

108   December 31, 2002 total debt ratio was 59.79%, which is within the target range for

109   a BBB rating. Thus, the Company's capital structure is reasonable for rate-making

110   purposes.

111   **Q. Why did you compare the Company's December 31, 2002 total debt ratio to**

112   **the published S&P targets for utilities with a business profile score of 3?**

113   A.   A firm's market-required return on common equity is a function of its operating and

114   financial risks. S&P business profile scores reflect the operating risk of a utility.

115   S&P focuses on industry characteristics as well as the company's competitive

116   position and management. A utility's business profile is evaluated on a scale of one

117   to ten. A rating of one denotes below average business risk, while a rating of ten

118   denotes above average business risk.[10] I imputed an S&P business profile score

119   for the Company, since it does not have one. I began with twelve market-traded

120   water/sewer companies with S&P business profile scores listed in S&P *Utilities &*

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[7] This capital structure reflects the adjustment to the Company's proposed long-term debt balance noted previously.

[8] Standard & Poor's Utilities Rating Service: Industry Commentary, May 20, 1996, p. 1.

[9] Standard & Poor's, "Utilities Financial Targets are Revised," June 18, 1999.

[10] Standard & Poor's, *Corporate Ratings Criteria 2002,* www.standardandpoors.com/ratings, p. 17.

6

121   *Perspectives.* The average business profile score of the twelve water/sewer utilities

122   is 2.75. From that average business profile score, I concluded that a business

123   profile score of 3 would be a reasonable estimate for the Company.

124   Q.   **Why did you compare the Company's December 31, 2002 total debt ratio to**

125   **the published S&P targets for BBB-rated companies?**

126   A.   As noted previously, the Company is a 100% equity financed, wholly owned

127   subsidiary of UI. Since the Company is wholly dependent on UI for external capital,

128   the financial risk of the Company is essentially the financial risk of UI. Therefore, I

129   estimated a credit rating based on data from UI's financial statements. The

130   financial ratios I calculated indicate that UI's financial strength is commensurate with

131   a strong BBB rating.

132   Q.   **Did you adjust any of the data in UI's financial statements before calculating**

133   **the financial ratios?**

134   A.   Yes. I adjusted the tax expense and the operating and net income to remove the

135   effects of merger expenses UI recorded on its financial statements. UI recorded

136   merger expenses of almost $10 million per year during 2001 and 2002. However,

137   the Company has indicated that it does not expect to continue to incur such merger

138   expenses.[11] The inclusion of those non-recurring merger expenses results in

139   financial ratios that understate UI's true financial strength. Thus, the effects of those

140   merger expenses should be removed to accurately reflect UI's financial outlook.

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[11] Company response to Staff data request MGM 3.04.

141 **Q. Please describe the ratio analysis that led you to conclude that UI's financial**

142 **strength is consistent with a strong BBB corporate credit rating.**

143 A. S&P publishes targets for the following four financial ratios (collectively, the

144 "Benchmark Ratios") that it uses in its analysis of investor-owned utilities: (1) funds

145 from operations ("FFO") to total debt; (2) FFO interest coverage; (3) pre-tax interest

146 coverage; and (4) total debt to total capital.[12] The Benchmark Ratios measure

147 financial risk. The financial targets vary with the business profile score. The S&P

148 published targets for utilities with business profile scores of 3 indicate that UI's

149 financial strength is consistent with a strong BBB corporate credit rating. Table 1

150 presents UI's financial ratios for 2002 and the 2000-2002 period average.

151 **Table 1:**
152 **S&P Utility Benchmark Credit Ratio Analysis**

Financial Ratio	Utilities, Inc.		S&P Target Range BBB-rated utilities with a business profile score of 3	S&P Target Range A-rated utilities with a business profile score of 3
	2002	3-year average		
FFO to Total Debt	12.7%	14.2%	14.0% – 20.0%	20.0% – 26.0%
FFO Interest Coverage	2.9x	3.0x	2.1x – 3.1x	3.1x – 3.9x
Pretax Interest Coverage	2.3x	2.8x	1.8x – 2.8x	2.8x – 3.4x
Total Debt to Total Capital	60.3%	56.4%	53.0% – 61.0%	47.5% – 53.0%

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[12] Standard & Poor's, "Utility Financial Targets are Revised," June 18, 1999.

153   **Cost of Long-term Debt**

154   **Q.   Please describe the adjustments you made to the Company's proposed**

155   **embedded cost of long-term debt.**

156   A.   I made the following adjustments to the Company's proposed embedded cost of

157   long-term debt: (1) the coupon interest expense for the four outstanding promissory

158   notes was adjusted to reflect their interest rates multiplied by their respective face

159   amounts outstanding and (2) the annual amortization of debt expense was adjusted

160   to reflect straight-line amortization of each issue's December 31, 2002 unamortized

161   debt expense balance over its remaining life.

162   **Q.   What is the Company's embedded cost of long-term debt?**

163   A.   As of December 31, 2002, the Company's embedded cost of long-term debt was

164   7.50%, as shown on Schedule 4.2.

165   **Cost of Common Equity**

166   **Q.   What is the Company's cost of common equity?**

167   A.   My analysis indicates that the Company's cost of common equity is 9.97%.

168   **Q.   How did you measure the investor-required rate of return on common**

169   **equity for the Company?**

170   A.   I measured the investor-required rate of return on common equity for the Company

171   with discounted cash flow ("DCF") and risk premium models. Since the Company

172   does not have market-traded common stock, DCF and risk premium models cannot

173   be applied directly to the Company; therefore, I applied both models to a sample of

174   nine public utilities ("Utility Sample") and a sample of seven water companies

175   ("Water Sample") comparable in risk to the Company.

176   Sample Selection

177   Q.   **How did you select the Utility Sample?**

178   To form the Utility Sample, I selected all domestic electric and gas distribution

179   utilities listed in the S&P *Utility Compustat II* database with credit ratings from A to

180   BBB and business profile scores of 3. Further, I eliminated any limited liability

181   companies because of their corporate income tax-free status. The nine public

182   utilities meeting those criteria compose the Utility Sample and are presented on

183   Schedule 4.3.

184   Q.   **How did you select the Water Sample?**

185   A.   For my Water Sample, I included all domestic water companies for which I had

186   sufficient data to conduct DCF and risk premium analyses that are not being

187   acquired by another company. Schedule 4.3 presents the seven water utilities

188   composing the Water Sample.

189   DCF Analysis

190   Q.   **Please describe DCF analysis.**

191   A.   For a utility to attract common equity capital, it must provide a rate of return on

192   common equity sufficient to meet investor requirements. DCF analysis establishes

193   a rate of return directly from investor requirements. Implementation of a DCF

194   analysis does not require a comprehensive analysis of a utility's operating and

                            10

195   financial risks since the market price of a utility's stock already embodies the

196   market consensus of those risks.

197   According to DCF theory, a security price equals the present value of the cash flow

198   investors expect it to generate. Specifically, the market value of common stock

199   equals the cumulative value of the expected stream of future dividends after each is

200   discounted by the investor-required rate of return.

201   **Q.**   **Please describe the DCF model with which you measured the investor-**

202   **required rate of return on common equity.**

203   A.   As it applies to common stocks, DCF analysis is generally employed to determine

204   appropriate stock prices given a specified discount rate. Since a DCF model

205   incorporates time-sensitive valuation factors, it must correctly reflect the timing of

206   the dividend payments that stock prices embody. As such, incorporating stock

207   prices that the financial market sets on the basis of quarterly dividend payments into

208   a model that ignores the time value of quarterly cash flows constitutes a

209   misapplication of DCF analysis.

210   The companies in both samples pay dividends quarterly; therefore, I applied a

211   constant-growth DCF model that measures the annual required rate of return on

212   common equity as follows:

213

$$k = \frac{\sum_{q=1}^{4} D_{0,q}(1+g)(1+k)^{1-[x+0.25(q-1)]}}{P} + g.$$

where P $\equiv$ the current stock price;

11

$D_{0,q}$ $\equiv$ the last dividend paid at the end of quarter q, where $q = 1$ to 4;

k $\equiv$ the cost of common equity;

x $\equiv$ the elapsed time between the stock observation and first dividend payment dates, in years; and

g $\equiv$ the expected dividend growth rate.

214 The expression $(1 + k_e)^{1-[x+0.25(q-1)]}$ is a future value factor that measures the value of

215 the expected dividend $(D_{0,q}(1 + g))$ one year from the stock price measurement

216 date. The DCF model above assumes dividends will grow at a constant rate, and

217 the market value of common stock (i.e., stock price) equals the sum of the

218 discounted value of each dividend.

219 **Q.** **How did you estimate the growth rate parameter?**

220 A. Determining the market-required rate of return with the DCF methodology requires

221 a growth rate that reflects the expectations of investors. Although the current market

222 price reflects aggregate investor expectations, market-consensus expected growth

223 rates cannot be observed directly. Therefore, I measured market-consensus

224 expected growth indirectly with growth rates forecasted by securities analysts that

225 are disseminated to investors.

226 IBES and Zacks summarize and publish the earnings growth expectations of

227 financial analysts employed by the research departments of investment brokerage

228 firms. Both provide forward-looking, expectational estimates of earnings growth.

229 Therefore, I averaged the IBES and Zacks growth rate estimates to measure

230 market-consensus expected growth. Schedule 4.3 presents the analysts' growth

231 rate estimates for the companies in the Utility Sample and the Water Sample.

232 **Q.   How did you measure the stock price?**

233 A.   A current stock price reflects all information that is available and relevant to the

234   market; thus, it represents the market's assessment of the common stock's current

235   value. I measured each company's current stock price with its closing market price

236   from August 20, 2003. Those stock prices appear on Schedule 4.4.

237   Since current stock prices reflect the market's current expectation of the cash flows

238   the securities will produce and the rate at which those cash flows are discounted, an

239   observed change in the market price does not necessarily indicate a change in the

240   required rate of return on common equity. Rather, a price change may reflect

241   investors' re-evaluation of the expected dividend growth rate. In addition, stock

242   prices change with the approach of dividend payment dates. Consequently, when

243   estimating the required return on common equity with the DCF model, one should

244   measure the expected dividend yield and the corresponding expected growth rate

245   concurrently. Using an historical stock price along with current growth expectations

246   or combining an updated stock price with past growth expectations will likely

247   produce an inaccurate estimate of the market-required rate of return on common

248   equity.

249 **Q.   Please explain the significance of the column titled "Next Dividend Payment**

250   **Date" shown on Schedule 4.4.**

251 A.   Estimating year-end dividend values requires measuring the length of time between

252   each dividend payment date and the first anniversary of the stock observation date.

253   For the first dividend payment, that length of time is measured from the "Next

254   Dividend Payment Date." Subsequent dividend payments occur in quarterly

255   intervals.

256   **Q.**   **How did you estimate the next four expected quarterly dividends?**

257   A.   Most utilities declare and pay the same dividend per share for four consecutive

258   quarters before adjusting the rate. Consequently, I assumed the dividend rate will

259   adjust during the same quarter it changed during the preceding year. If the utility did

260   not change its dividend during the last year, I assumed the rate would change during

261   the next quarter. The average expected growth rate was applied to the current

262   dividend rate to estimate the expected dividend rate.[13] Schedule 4.4 presents the

263   current quarterly dividends. Schedule 4.5 presents the expected quarterly

264   dividends.

265   **Q.**   **Based on your DCF analysis, what are the estimated required rates of return**

266   **on common equity for the Utility Sample and the Water Sample?**

267   A.   The DCF analysis estimated a required rate of return on common equity of 9.68%

268   for the Utility Sample and 10.02% for the Water Sample, as shown on Schedule 4.6.

269   Those results represent averages of the DCF estimates for the individual

270   companies in the two samples,[14] which are derived from the growth rates presented

271   on Schedule 4.3, the stock price and dividend payment dates presented on

272   Schedule 4.4, and the expected quarterly dividends presented on Schedule 4.5.

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[13] Unless the next dividend has already been declared and differed from that indicated by this methodology, in which case, the declared dividend value was entered. This was the case for Philadelphia Suburban, Laclede Group, and NUI Corp.

[14] With the exception of American States Water Company, whose 6.50% DCF estimate was discarded from the Water Sample average. The Water Sample had no extreme high-end individual DCF results to counterbalance the extremely low results for American States Water Company.

273   Risk Premium Analysis

274   **Q.   Please describe the risk premium model.**

275   A.   The risk premium model is based on the theory that the market-required rate of

276   return for a given security equals the risk-free rate of return plus a risk premium

277   associated with that security. A risk premium represents the additional return

278   investors expect in exchange for assuming the risk inherent in an investment.

279   Mathematically, a risk premium equals the difference between the expected rate of

280   return on a risk factor and the risk-free rate. If the risk of a security is measured

281   relative to a portfolio, then multiplying that relative measure of risk and the portfolio's

282   risk premium produces a security-specific risk premium for that risk factor.

283   The risk premium methodology is consistent with the theory that investors are risk-

284   averse. That is, investors require higher returns to accept greater exposure to risk.

285   Thus, if investors had an opportunity to purchase one of two securities with equal

286   expected returns, they would purchase the security with less risk. Conversely, if

287   investors had an opportunity to purchase one of two securities with equal risk, they

288   would purchase the security with the higher expected return. In equilibrium, two

289   securities with equal quantities of risk have equal required rates of return.

290   The Capital Asset Pricing Model ("CAPM") is a one-factor risk premium model that

291   mathematically depicts the relationship between risk and return as:

292                          $$R_j = R_f + \beta_j \times (R_m - R_f)$$

                      where R_j ≡ the required rate of return for security j;

15

$R_f \equiv$ the risk-free rate;

$R_m \equiv$ the expected rate of return for the market portfolio; and

$\beta_j \equiv$ the measure of market risk for security j.

293   In the CAPM, the risk factor is market risk, which is defined as risk that cannot be

294   eliminated through portfolio diversification. To implement the CAPM, one must

295   estimate the risk-free rate of return, the expected rate of return on the market

296   portfolio, and a security or portfolio-specific measure of market risk.

297   **Q.**   **How did you estimate the risk-free rate of return?**

298   A.   I examined the suitability of the yields on three-month U.S. Treasury bills and thirty-

299   year U.S. Treasury bonds as estimates of the risk-free rate of return.

300   **Q.**   **Why did you examine the yields on U.S. Treasury bills and bonds as**

301   **measures of the risk-free rate?**

302   A.   The proxy for the nominal risk-free rate should contain no risk premium and reflect

303   similar inflation and real risk-free rate expectations to the security being analyzed

304   through the risk premium methodology.[15] The yields of fixed income securities

305   include premiums for default and interest rate risk. Default risk pertains to the

306   possibility of default on principal or interest payments. Securities of the United

307   States Treasury are virtually free of default risk by virtue of the federal government's

308   fiscal and monetary authority. Interest rate risk pertains to the effect of unexpected

309   interest rate fluctuations on the value of securities.

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[15] Real risk-free rate and inflation expectations comprise the non-risk related portion of a security's rate of return.

310   Since common equity theoretically has an infinite life, its market-required rate of

311   return reflects the inflation and real risk-free rates anticipated to prevail over the long

312   run. U.S. Treasury bonds, the longest term treasury securities, were issued with

313   terms to maturity of thirty years;[16] U.S. Treasury notes are issued with terms to

314   maturity ranging from two to ten years; U.S. Treasury bills are issued with terms to

315   maturity ranging from four to twenty-six weeks. Therefore, U.S. Treasury bonds are

316   more likely to incorporate within their yields the inflation and real risk-free rate

317   expectations that drive, in part, the prices of common stocks than either U.S.

318   Treasury notes or Treasury bills.

319   However, due to relatively long terms to maturity, U.S. Treasury bond yields also

320   contain an interest rate risk premium that diminishes their usefulness as measures

321   of the risk-free rate. U.S. Treasury bill yields contain a smaller premium for interest

322   rate risk. Thus, in terms of interest rate risk, U.S. Treasury bill yields more

323   accurately measure the risk-free rate.

324   **Q.**   **Given the similarity in the inflation and real risk-free rate expectations that**

325   **are reflected in the yields on U.S. Treasury bonds and the prices of common**

326   **stocks, does it necessarily follow that the inflation and real risk-free rate**

327   **expectations that are reflected in the yields on U.S. Treasury bills and the**

328   **prices of common stocks are dissimilar?**

329   A.   No. To the contrary, short and long-term inflation and real risk-free rate

330   expectations, including those that are reflected in the yields on U.S. Treasury bills,

331   U.S. Treasury bonds, and the prices of common stocks, should equal over time.

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[16] In October 2001, the U.S. Treasury suspended the issuance of 30-year U.S. Treasury bonds.

332   Any other assumption implausibly implies that the real risk-free rate and inflation is

333   expected to systematically and continuously rise or fall.

334   Although expectations for short and long-term real risk-free rates and inflation

335   should equal over time, in finite time periods, short and long-term expectations may

336   differ. Short-term interest rates tend to be more volatile than long-term interest

337   rates.[17] Consequently, over time U.S. Treasury bill yields are less biased (i.e., more

338   accurate) but less reliable (i.e., more volatile) estimators of the long-term risk-free

339   rate than U.S. Treasury bond yields. In comparison, U.S. Treasury bond yields are

340   more biased (i.e., less accurate) but more reliable (i.e., less volatile) estimators of

341   the long-term risk-free rate. Therefore, an estimator of the long-term nominal risk-

342   free rate should not be chosen mechanistically. Rather, the similarity in current short

343   and long-term nominal risk-free rates should be evaluated. If those risk-free rates

344   are similar, then U.S. Treasury bill yields should be used to measure the long-term

345   nominal risk-free rate. If not, some other proxy or combination of proxies should be

346   used.

347   Q.   **What is the current yield on three-month U.S. Treasury bills and the current**

348   **estimated yield on thirty-year U.S. Treasury bonds?**

349   A.   Three-month U.S. Treasury bills are currently yielding 0.96%. The estimated yield

350   for U.S. Treasury bonds equals 5.48%.[18] Both estimates are derived from quotes

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[17] Fabozzi and Pollack, ed., *The Handbook of Fixed Income Securities*, Fourth Edition, Irwin, p. 789.
[18] Since the suspension of the 30-year U.S. Treasury bond, the U.S. Treasury publishes a Long-Term Average Rate, which represents the arithmetic average of the bid yields on all outstanding fixed-coupon securities with 25 years or more remaining to maturity. Additionally, the U.S. Treasury publishes daily linear extrapolation factors that can be added to the Long-Term Average Rate to estimate a 30-year rate. www.treas.gov/offices/domestic-finance/debt-management/interest-rate/ltcompositeindex.html

351   for August 20, 2003.[19] Schedule 4.7 presents the published quotes and effective

352   yields.

353   **Q.**   **Of the U.S. Treasury bill and bond yields, which is currently a better proxy**

354   **for the long-term risk-free rate?**

355   A.   In terms of the gross domestic product ("GDP") price index, the Energy Information

356   Administration ("EIA") forecasts the inflation rate will average 2.5% annually during

357   the 2003-2025 period.[20] In terms of the Consumer Price Index ("CPI"), the EIA

358   forecasts the inflation rate will average 2.9%annually during the 2003-2025 period.

359   In comparison, Global Insight forecasts that the GDP price index inflation will

360   average 2.6% annually while the CPI inflation will average 3.1% annually during the

361   2003-2027 period.[21] In terms of the CPI, the Survey of Professional Forecasters

362   ("Survey") forecasts the inflation rate will average 2.5% during the next ten years.[22]

363   In terms of real GDP growth, EIA forecasts the real risk-free rate will average 3.1%

364   during the 2003-2025 period;[23] Global Insight forecasts the real risk-free rate will

365   average 3.0% during the 2003-2027 period;[24] and the Survey forecasts the real

366   risk-free rate will average 3.2% during the next ten years.[25] Those forecasts imply a

367   long-term, nominal risk-free rate between 5.7% and 6.2%.[26] Therefore, EIA, Global

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[19] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, www.federalreserve.gov/releases/H15/update/, August 21, 2003.

[20] Energy Information Administration, *EIA Annual Energy Outlook*, Table 20, Macroeconomic Indicators, December 2002.

[21] Global Insight, "The U.S. Economy: The 25 Year Focus," Table 15, Fall 2002.

[22] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/survq203.html, May 20, 2003. The *Survey* aggregates the forecasts of approximately thirty forecasters.

[23] Energy Information Administration, *EIA Annual Energy Outlook*, Table 20, Macroeconomic Indicators, December 2002.

[24] Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1, Winter 2003.

[25] *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/survq103.html, February 24, 2003.

[26] Nominal interest rates are calculated as follows:

368   Insight, and *Survey* forecasts of inflation and real GDP growth expectations suggest

369   that, currently, the U.S. Treasury bond yield more closely approximates the long-term

370   risk-free rate. It should be noted, however, the U.S. Treasury bond yield is an

371   upwardly biased estimator of the long-term risk-free rate due to the inclusion of an

372   interest rate risk premium associated with its relatively long term to maturity.[27]

373 **Q.** **Please explain why the real risk-free rate and the GDP growth rate should be**

374   **similar.**

375 **A.** Risk-free securities provide a rate of return sufficient to compensate investors for

376   the time value of money, which is a function of production opportunities, time

377   preferences for consumption, and inflation.[28] The real risk-free rate excludes the

378   premium for inflation. The real GDP growth rate measures output of goods and

379   services without reflecting inflation expectations and, as such, also reflects both

380   production and consumers' consumption preferences. Therefore, both the real

381   GDP growth rate and the real risk-free rate of return should be similar since both are

382   a function of production opportunities and consumption preferences without the

383   effects of either a risk premium or an inflation premium.

$$r = (1 + R) \times (1 + i) - 1.$$

where r $\equiv$ nominal interest rate;
                R $\equiv$ real interest rate; and
                i $\equiv$ inflation rate.

[27] For example, the current long-term government bond yield of 5.48% and the average historic realized horizon premium of 1.5% during the last 32 years (Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation, 2003 Yearbook*, p. 177) imply a risk-free rate of approximately 3.9%.

[28] Brigham and Houston, <u>Fundamentals of Financial Management</u>, 8th edition.

384   **Q.**   **How was the expected rate of return on the market portfolio estimated?**

385   A.   The expected rate of return on the market was estimated by conducting a DCF

386   analysis on the firms composing the S&P 500 Index ("S&P 500") as of June 30,

387   2003. That analysis used dividend information reported in the July 2003 edition of

388   S&P's *Security Owner's Stock Guide* and closing market prices reported by the

389   Chicago Board of Options Exchange on July 1, 2003. Growth rate estimates were

390   obtained from the June 2003 edition of *IBES Monthly Summary Data* and August

391   7, 2003 Zacks reports. Firms not paying a dividend as of June 30, 2003, or for

392   which neither IBES nor Zacks growth rates were available were eliminated from the

393   analysis. The resulting company-specific estimates of the expected rate of return on

394   common equity were then weighted using market value data from the Chicago

395   Board of Options Exchange on July 1, 2003. The estimated weighted average

396   expected rate of return for the remaining 359 firms, composing 83.76% of the

397   market capitalization of the S&P 500, equals 13.66%.

398   **Q.**   **How did you measure market risk on a security-specific basis?**

399   A.   I used the beta coefficient in my risk premium analysis. Beta measures risk in a

400   portfolio context. When multiplied by the market risk premium, a security's beta

401   produces a market risk premium specific to that security. I developed two distinct

402   sample average betas for each of my samples, one based on the Value Line

403   methodology ("Value Line beta") and the other based on the Merrill Lynch

404   methodology ("Regression beta").[29]

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[29] The Regression beta methodology is the same as the Merrill Lynch methodology except the
Regression beta methodology substitutes (1) total excess return data for the total price change data that the
Merrill Lynch methodology uses and (2) the NYSE Composite Index for the S&P500 Index as a proxy for the
market return. The former substitution does not significantly affect the beta estimate; however , using the

405   When available, I used published Value Line beta estimates for each company in

406   each sample.[30] For those companies that did not have published Value Line beta

407   estimates, I calculated beta estimates using the Value Line methodology.[31] Value

408   Line estimates beta for a security with the following model using an ordinary least-

409   squares technique:[32]

410

$$R_{j,t} = a_j + \beta_j \times R_{m,t} + e_{j,t}$$

where $R_{j,t} \equiv$ the return on security j in period t;

$R_{m,t} \equiv$ the return on the market portfolio in period t;

$a_j \quad \equiv$ the intercept term for security j;

$\beta_j \quad \equiv$ beta, the measure of market risk for security j; and

$e_{j,t} \quad \equiv$ the residual term in period t for security j.

411   A beta can be calculated for firms with market-traded common stock. Value Line

412   calculates its betas in two steps. First, the returns of each company are regressed

413   against the returns of the New York Stock Exchange Composite Index ("NYSE

414   Index") to estimate a raw beta. The Value Line regression employs 260 weekly

415   observations of stock price data. Then, an adjusted beta is estimated through the

416   following equation:

NYSE Composite Index as a proxy for the market return produced higher utility betas than using the
S&P500 Index.

[30] The Value Line Investment Survey, "Summary and Index," August 15, 2003, pp. 2-17.

[31] The Value Line service to which the Commission subscribes does not provide beta estimates for
Artesian Resources, Middlesex Water, Southwest Water, or York Water.

[32] Statman, Meir, "Betas Compared: Merrill Lynch vs. Value Line", *The Journal of Portfolio Management*,
Winter 1981.

417 $$\beta_{adjusted} = 0.35 + 0.67 \times \beta_{raw}.$$

418 For the Regression beta, I calculated a single beta estimate for each sample with

419 the following model using an ordinary least-squares technique:

420 $$R_{j,t} - R_{f,t} = \alpha + \beta \ (R_{m,t} - R_{f,t}) + \varepsilon_t$$

where $R_{j,t} \equiv$ the return on security j in period t;

$R_{f,t} \equiv$ the risk-free rate of return in period t;

$R_{m,t} \equiv$ the return on the market portfolio in period t;

$\alpha \quad \equiv$ the intercept term for security j;

$\beta \quad \equiv$ beta, the measure of market risk for security j; and

$\varepsilon_t \quad \equiv$ the residual term in period t for security j.

421 The Regression beta estimates for the Utility Sample and the Water Sample were

422 calculated in three steps using regression analysis. First, the U.S. Treasury bill

423 return was subtracted from the average percentage change in the sample's stock

424 prices and the percentage change in the NYSE Index to estimate the portfolio's

425 return in excess of the risk-free rate. Second, the excess returns of the two samples

426 were regressed against the excess returns of the NYSE Index to estimate a raw

427 beta. The regression analysis employs 60 monthly observations of stock and U.S.

428 Treasury bill return data. Third, an adjusted beta is estimated through the following

429 equation:

23

430 $$\beta_{adjusted} = 0.33743 + 0.66257 \times \beta_{raw}.$$

431 **Q.** **Why did you adjust the raw beta estimate?**

432 A. I adjusted the raw beta estimate for two reasons. First, betas tend to regress

433 towards the market mean value of 1.0 over time; therefore, the adjustment

434 represents an attempt to estimate a forward-looking beta. Second, empirical tests

435 of the CAPM suggest that the linear relationship between risk, as measured by raw

436 beta, and return is flatter than the CAPM predicts. That is, securities with raw betas

437 less than one tend to realize higher returns than the CAPM predicts. Conversely,

438 securities with raw betas greater than one tend to realize lower returns than the

439 CAPM predicts. Adjusting the raw beta estimate towards the market mean value of

440 1.0 compensates for the observed flatness in the linear relationship between risk

441 and return.[33]

442 **Q.** **What are the beta estimates for the Utility Sample and the Water Sample?**

443 A. The average Value Line adjusted beta for the Utility Sample is 0.64. The

444 Regression beta estimate for the Utility Sample is 0.49. The average of those two

445 estimates is 0.57. The average Value Line adjusted beta for the Water Sample is

446 0.57. The Regression beta estimate for the Water Sample is 0.42. The average of

447 those two estimates is 0.50.

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[33] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980.

448   **Q.**   **What required rates of return on common equity does the risk premium**

449   **model estimate for the two samples?**

450   **A.**   The risk premium model estimates a required rate of return on common equity of

451   10.14% for the Utility Sample and 9.57% for the Water Sample. The computation of

452   those estimates appears on Schedule 4.7.

453   Cost of Equity Recommendation

454   **Q.**   **Based on your entire analysis, what is your estimate of the Company's cost**

455   **of common equity?**

456   **A.**   A thorough analysis of the required rate of return on common equity requires both

457   the application of financial models and the analyst's informed judgment. An

458   estimate of the required rate of return on common equity based solely on judgment

459   is inappropriate. Nevertheless, because techniques to measure the required rate of

460   return on common equity necessarily employ proxies for investor expectations,

461   judgment remains necessary to evaluate the results of such analyses. Along with

462   DCF and risk premium cost of equity analyses, I have considered the observable

463   6.69% rate of return the market currently requires on less risky BBB-rated long-term

464   debt.[34] In addition, I have considered the pre-tax interest coverage ratio of 2.38x

465   resulting from my cost of capital and capital structure recommendations. As

466   indicated by the S&P target ranges presented in Table 1 above, a pre-tax interest

467   coverage ratio of 2.38x is consistent with a strong BBB credit rating for a utility with

468   a business profile score of 3. Thus, based on my analysis, in my judgment the

469   investor-required rate of return on common equity for the Company is 9.97%.

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[34] The Value Line Investment Survey, Selection & Opinion, August 15, 2003.

470   **Q.**   **Please summarize how you determined the investor-required rate of return**

471   **on common equity for the Company.**

472   A.   An average of the DCF and risk premium estimates for the Utility Sample and the

473   Water Sample yielded a preliminary cost of equity estimate of 9.85%. I adjusted

474   that estimate upward by 12 basis points to reflect the difference in risk between UI

475   and the proxy samples, which produced a final cost of equity estimate of 9.97%.

476   The models from which the individual company estimates were derived are correctly

477   specified and thus contain no source of bias. Moreover, I am unaware of bias in my

478   proxy for investor expectations.[35] In addition, measurement error has been

479   minimized through the use of a sample, since estimates for a sample as a whole

480   are subject to less measurement error than individual company estimates.

481   **Q.**   **Why did you adjust your estimate of the Company's cost of common equity**

482   **upward from your preliminary estimates for the Utility Sample and the Water**

483   **Sample?**

484   A.   The Utility Sample and the Water Sample serve as proxies for the target company

485   and should therefore reflect the risks of that company. If the proxies do not

486   accurately reflect the risk level of the target company, an adjustment should be

487   made. Therefore, a review of the relative risks of the Utility Sample, the Water

488   Sample, and the Company is necessary. Using information from UI's financial

489   statements and Standard & Poor's *Utility Compustat II* database, I examined and

490   compared the 2000-2002 average Benchmark Ratios of the Company, the Utility

491   Sample, and the Water Sample. Schedule 4.8 presents this information. The Utility

492   Sample's and Water Sample's Benchmark Ratios suggest slightly lower levels of

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[35] Except as discussed above in regard to U.S. Treasury bond yields as proxies for the long-term risk-free rate.

493   risk relative to that of the Company. Those ratios indicate a credit rating of

494   approximately BBB+ for the proxy samples and a strong BBB rating for the

495   Company. Financial theory posits that investors require higher returns to accept

496   greater exposure to risk. Thus, given the difference between the implied credit

497   rating for the Company on those for the Utility Sample and the Water Sample, an

498   small upward adjustment is appropriate.

499   **Q.**   **How did you establish the 12 basis point adjustment used to determine the**

500   **Company's final cost of equity estimate?**

501   A.   The 12 basis point adjustment is based on the spread between long-term utility debt

502   yields rated BBB+ and BBB.[36] In my judgment, 12 basis points is a reasonable

503   level of adjustment, since the Benchmark Ratios indicate a credit rating of

504   approximately BBB+ for the proxy samples and a strong BBB rating for the

505   Company.

506   **Q.**   **Please explain your decision to weight the two samples equally when**

507   **determining the Company's overall cost of equity.**

508   A.   A comparison of the four Benchmark Ratios for the two samples, as shown on

509   Schedule 4.8, indicates that the risk levels of the Utility Sample and the Water

510   Sample were not materially different from each other. Therefore, I concluded that

511   both samples were equally comparable to UI.

---

[36] Reuters Corporate Spreads for Utilities, www.bondsonline.com, August 21, 2003.

512   **Overall Cost of Capital Recommendation**

513   **Q.   What is the Company's overall cost of capital?**

514   A.   As shown on Schedule 4.1, the Company's overall cost of capital equals 8.49%.

515   That estimate incorporates the midpoint cost of common equity of 9.97%.

516   **Q.   Does this conclude your testimony?**

517   A.   Yes.

Charmar Water Company

Weighted Average Cost of Capital
December 31, 2002

Company Proposal

	Amount	Percent of Total Capital	Cost	Weighted Cost
Long-term Debt	$115,319,616	59.76%	7.24%	4.33%
Common Equity	$77,650,144	40.24%	10.02%	4.03%
Total Capital	$192,969,760	100.00%		

Weighted Average Cost of Capital   **8.36%**

Staff Proposal

	Amount	Percent of Total Capital	Cost	Weighted Cost
Long-term Debt	$115,472,241	59.79%	7.50%	4.49%
Common Equity	$77,650,144	40.21%	9.97%	4.01%
Total Capital	$193,122,385	100.00%		

Weighted Average Cost of Capital   **8.49%**

Charmar Water Company

Embedded Cost of Long-term Debt
December 31, 2002

	Coupon Rate, Debt Issue Type, (A)	Date Issued (B)	Maturity Date (C)	Original Principal Amount (D)	Face Amount Outstanding (E)	Unamortized Debt Discount or (Premium) (F)	Unamortized Debt Expense (G)	Carrying Value (H)	Coupon Interest Expense (I)	Amortization of Debt Discount or (Premium) (J)	Amortization of Debt Expense (K)	Total Expense (L)
	First Mortgage Bonds											
1	5.41% Collateral Trust Note	30-Aug-02	30-Aug-12	$50,000,000	$50,000,000	$1,291,961		$48,708,039	$2,705,000		$133,588	$2,838,588
2	8.42% Collateral Trust Note	15-Jun-00	30-Jun-15	41,000,000	41,000,000	881,396		40,118,604	3,452,200		70,489	3,522,689
3	9.16% Collateral Trust Note	15-May-91	30-Apr-06	10,000,000	4,000,000	34,764		3,965,236	366,400		10,435	376,835
4	9.01% Collateral Trust Note	15-Jul-92	30-Nov-07	15,000,000	7,500,000	111,661		7,388,339	675,750		22,705	698,455
5	7.87% Collateral Trust Note	1-Jun-95	1-Jun-05	15,000,000	15,000,000	42,516		14,957,484	1,180,500		17,575	1,198,075
6	8.84% Promissory Note	1-Sep-97	20-Dec-12	100,000	79,424			79,424	7,021			7,021
7	8.60% Promissory Note	1-Sep-97	21-Dec-15	100,000	83,884			83,884	7,214			7,214
8	8.10% Promissory Note	1-Sep-97	15-Nov-15	100,000	84,072			84,072	6,810			6,810
9	8.96% Promissory Note	1-Sep-97	20-Dec-16	100,000	87,159			87,159	7,809			7,809
				$131,400,000	$117,834,539	$2,362,298		$115,472,241	$8,408,704		$254,791	$8,663,496
												7.50%

Source: Company response to Staff Data Request MGM 1.02

Charmar Water Company

Growth Rate Estimates

Utility Sample

Company	Zacks	IBES	Average
AGL Resources, Inc.	6.00%	5.53%	5.77%
Cascade Energy Corp.	N/A	4.00	4.00
Consolidated Edison, Inc.	2.90	3.16	3.03
Energy East Corp.	4.83	5.48	5.16
Laclede Gas Co.	4.00	4.00	4.00
Northwest Natural Gas Co.	4.56	4.67	4.62
NSTAR	4.50	5.60	5.05
NUI Corp.	4.67	2.00	3.34
Piedmont Natural Gas Co.	5.00	5.00	5.00

Water Sample

Company	Zacks	IBES	Average
American States Water Co.	3.00%	3.00%	3.00%
Artesian Resources	8.00	8.00	8.00
California Water Service Group	3.00	3.00	3.00
Middlesex Water Co.	7.00	7.00	7.00
Philadelphia Suburban Corp.	8.42	8.80	8.61
Southwest Water Co.	7.00	9.00	8.00
York Water Co.	7.00	7.00	7.00

Sources: *Zacks Investment Research*, August 20, 2003
   Institutional Brokers Estimate System, July 17, 2003

Charmar Water Company

Quarterly Dividends and Stock Prices
as of August 20, 2003

Utility Sample

Company	Current Dividend				Next Dividend Payment Date	Stock Price
	$D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$		
AGL Resources, Inc.	$0.270	$0.270	$0.280	$0.280	12/1/2003	$27.73
Cascade Energy Corp.	0.240	0.240	0.240	0.240	11/14/2003	18.55
Consolidated Edison, Inc.	0.555	0.560	0.560	0.560	12/15/2003	39.83
Energy East Corp.	0.240	0.250	0.250	0.250	11/14/2003	21.44
Laclede Gas Co.	0.335	0.335	0.335	0.335	10/1/2003	27.95
Northwest Natural Gas Co.	0.315	0.315	0.315	0.315	11/14/2003	28.86
NSTAR	0.530	0.540	0.540	0.540	11/3/2003	45.32
NUI Corp.	0.245	0.245	0.245	0.245	9/15/2003	15.78
Piedmont Natural Gas Co.	0.400	0.400	0.415	0.415	10/15/2003	38.68

Water Sample

Company	Current Dividend				Next Dividend Payment Date	Stock Price
	$D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$		
American States Water Co.	$0.221	$0.221	$0.221	$0.221	12/1/2003	$25.87
Artesian Resources	0.193	0.198	0.198	0.198	11/21/2003	24.80
California Water Service Group	0.280	0.281	0.281	0.281	11/14/2003	26.31
Middlesex Water Co.	0.215	0.215	0.215	0.215	12/1/2003	27.00
Philadelphia Suburban Corp.	0.140	0.140	0.140	0.140	12/1/2003	23.57
Southwest Water Co.	0.053	0.058	0.058	0.058	10/21/2003	14.42
York Water Co.	0.130	0.135	0.135	0.135	10/15/2003	18.01

Charmar Water Company

Expected Quarterly Dividends

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
AGL Resources, Inc.	$0.280	$0.280	$0.296	$0.296
Cascade Energy Corp.	0.250	0.250	0.250	0.250
Consolidated Edison, Inc.	0.560	0.577	0.577	0.577
Energy East Corp.	0.250	0.263	0.263	0.263
Laclede Gas Co.	0.335	0.348	0.348	0.348
Northwest Natural Gas Co.	0.330	0.330	0.330	0.330
NSTAR	0.540	0.567	0.567	0.567
NUI Corp.	0.245	0.253	0.253	0.253
Piedmont Natural Gas Co.	0.415	0.415	0.436	0.436

Water Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
American States Water Co.	0.228	0.228	0.228	0.228
Artesian Resources	0.198	0.214	0.214	0.214
California Water Service Group	0.281	0.290	0.290	0.290
Middlesex Water Co.	0.230	0.230	0.230	0.230
Philadelphia Suburban Corp.	0.150	0.150	0.150	0.150
Southwest Water Co.	0.058	0.063	0.063	0.063
York Water Co.	0.135	0.144	0.144	0.144

Sources: Schedules 4.3 and 4.4

Charmar Water Company

DCF Cost of Common Equity Estimates

Utility Sample

Company	Estimate
AGL Resources, Inc.	10.06%
Cascade Energy Corp.	9.58
Consolidated Edison, Inc.	8.94
Energy East Corp.	10.19
Laclede Gas Co.	9.17
Northwest Natural Gas Co.	9.35
NSTAR	10.20
NUI Corp.	10.05
Piedmont Natural Gas Co.	9.59
Average	9.68%

Water Sample

Company	Estimate
American States Water Co.	*
Artesian Resources	11.37%
California Water Service Group	7.36
Middlesex Water Co.	10.38
Philadelphia Suburban Corp.	11.14
Southwest Water Co.	9.71
York Water Co.	10.17
Average	10.02%

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* American States Water Co.'s 6.50% DCF estimate was excluded from the Water Sample average because it was extremely low in relation to the remaining estimates and to current utility bond rates.

Charmar Water Company

Interest Rates as of August 20, 2003

U.S. Treasury Bills[1]		U.S. Treasury Bonds[2]	
Discount Rate	Effective Yield	Bond Equivalent Yield	Effective Yield
0.94%	0.96%	5.41%	5.48%

Risk Premium Cost of Equity Estimates

Utility Sample

Risk-Free Rate Proxy	Risk-Free Rate	Beta	Risk Premium	Cost of Common Equity
U.S. Treasury Bonds	5.48% +	0.57 ×	(13.66% − 5.48%) =	10.14%

Water Sample

Risk-Free Rate Proxy	Risk-Free Rate	Beta	Risk Premium	Cost of Common Equity
U.S. Treasury Bonds	5.48% +	0.50 ×	(13.66% − 5.48%) =	9.57%

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[1] U.S. Treasury bill yields are quoted on a 360 day discount basis. The effective yield is determined as follows:

$$Effective\ yield = \left[1 + \frac{discount\ rate \times \left(\frac{days\ to\ maturity}{360}\right)}{1 - discount\ rate \times \left(\frac{days\ to\ maturity}{360}\right)}\right]^{\left(\frac{365}{days\ to\ maturity}\right)} - 1$$

[2] The bond equivalent yield on U.S. Treasury bonds represents a nominal rather than an effective yield. The effective yield is calculated as follows:

$$Effective\ yield = [1 + (bond\ equivalent\ yield \div 2)]^2 - 1.$$

Charmar Water Company

Benchmark Ratios

Utilities, Inc.

Ratio	Value	
	2002	3-yr Avg. 1998-2000
Funds Flow from Operations to Total Debt	12.7%	14.2%
Funds Flow from Operations Interest Coverage	2.9X	3.0X
Pretax Interest Coverage	2.3X	2.8X
Total Debt to Total Capital	60.3%	56.4%

Utility Sample

Ratio	Value	
	2002	3-yr Avg. 1998-2000
Funds Flow from Operations to Total Debt	18.6%	18.2%
Funds Flow from Operations Interest Coverage	3.8X	3.6X
Pretax Interest Coverage	2.6X	2.9X
Total Debt to Total Capital	58.9%	57.8%

Water Sample

Ratio	Value	
	2000	3-yr Avg. 1998-2000
Funds Flow from Operations to Total Debt	15.8%	16.7%
Funds Flow from Operations Interest Coverage	3.5X	3.3X
Pretax Interest Coverage	3.0X	2.9X
Total Debt to Total Capital	56.4%	55.8%

Source: Response to Staff data request MGM 1.04
Standard & Poor's Utility Compustat II